# Brucella Melitensis

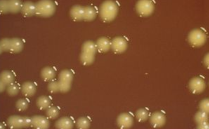
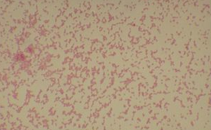
Presentation:

1. 38 yr old with **flu-like symptoms**, fever, rash, headache, anorexia🡪 for 8 weeks had complaints of joint pain, especially in lower back.
2. also had continuing **fevers, sweats, a 30 lb weight loss,** and **depression**
3. recently drank **unpasteurized goat milk**
4. PE: **lymphadenopathy** and mild **splenomegaly**. **Tenderness in sacroiliac joint**
5. Diagnosis: Brucellosis

DDx:

1. Brucellosis (Brucella spp)
2. Dengue fever
3. Hepatitis A, B, or C
4. Histoplasmosis (Histoplasma capsulatum)
5. Leptospirosis (Leptospira interrogans)
6. Lymphoma Subacute bacterial endocarditis
7. Tuberculosis (Mycobacterium tuberculosis)
8. Tularemia (Francisella tularensis)
9. Rationale: Chronic fevers and weight loss may be due to a variety of factors. Noninfectious etiologies (such as lymphoma) should be considered as well as infectious etiologies. Hepatitis may be considered owing to the elevated transaminases, but hepatitis would not usually cause such a prolonged illness. Dengue fever causes musculoskeletal pains, but it is not a chronic disease. The other etiologies (e.g., histoplasmosis, leptospirosis, tuberculosis, and tularemia) certainly may cause long illnesses, but they often have specific epidemiologic features or history of exposure. Brucella and Francisella are potential agents of bioterrorism, and if several cases occur without the usual risks present, that possibility should be considered. Endocarditis would be unusual without a history of IV drug use in a patient of this age.

Brucella Melitensis

1. zoonotic disease caused by 4 species of Brucella (abortus, melitensis, suis, and canis). This is the most virulent species.
2. Poorly staining, small, gram negative coccobacilli
3. seen mostly as single cells- appear like “fine sand”
4. all are kept at biosafety level 3
5. Brucellae are recovered from blood or bone marrow of infected individual after a long incubation period (at least 21 days)
6. on blood agar: appear as small, convex honhemolytic and translucent (see below picture on the right )
7. use oxidase / urease tests to help differentiate exact species
8. 
   1. Left: Gram stain of Brucella spp
   2. Right: Culture of Brucella melitensis on sheep blood agar, showing the smooth, translucent, nonhemolytic colonies.

Epidemiology:

1. worldwide distribution, most US cases are in TX and CA
2. maintained in cattle (abortus), swine (suis), dogs (canis), and goats / sheep (specifically Melitensis)
3. transmitted by ingestion of raw milk and dairy products from infected animals or contact with their tissues / fluids.
4. Aerosols of B. Melintesis are highly infectious🡪 makes it a potential bioterrorism agent

Pathogenesis:

1. low infective dose🡪 incubation period of 5-days to 6 months
2. bacteria enter the body🡪 engulfed by PMNs🡪 suppression of superoxide dismutase and other mechanisms of bacterial destruction🡪 replicate in phagocytes in regional lymph nodes and disseminate through body via blood stream
3. Dissemination induces multisystem infections involving liver, spleen, bones, kidneys, lymph nodes, heart valves, nervous system, and testes
4. have systemic inflammatory response triggered by LPS endotoxin🡪 cytokines are triggered (IL-1 and TNF) 🡪 see irregular fever and weight loss (key manifestations)
   1. systemic cytokine response also contributes to profuse sweating, chills, arthralgias, and generalized aching.
5. The disease can linger for months if not adequately treated. Osteoarticular complications (particularly of the sacroiliac joints) are seen in 20% to 60% of cases. Genitourinary involvement is reported in up to 20% of cases, with orchitis and epididymitis the most common. Endocarditis, which occurs in fewer than 2% of cases, accounts for the majority of brucellosis-related deaths.

Treatment / Prevention:

1. Doxycycline and either streptomycin / rifampcin for at least 6 weeks
   1. Quinolones have some activity.
2. can use corticosteroids for those with neurologic disease
3. Prevention
   1. no vaccine is available for humans, but there are vaccines for use in animals (against B. Melintesis and B. Abortus)
   2. be careful in disposing / processing of animal products